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ABSTRACT

This practicum was designed to improve the monitoring and maintenance of hearing aids and auditory trainers used by preschool and school-age deaf and hearing-impaired children, through inservice training of speech pathologists, teachers, parents, and students. The training focused on correct monitoring and maintenance procedures and the identification of malfunctioning or nonfunctioning equipment. Fourteen different inservice training programs were provided as well as individual inservice training over an 8-month period. As a result, a total of 124 hearing aids and auditory trainers were checked on a daily basis with several malfunctions immediately identified and repaired. Appendices include an unlabeled diagram of hearing aids and auditory trainer, a hearing aid and auditory trainer monitoring and maintenance pass/fail checklist, policies and procedures for hearing aid and auditory trainer monitoring and maintenance, a list of supplies, and a hearing aid and auditory trainer performance checklist. Includes 26 references.
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**Improving the Monitoring and Maintenance of Hearing Aids
for Preschool and School Age Deaf and Hearing Impaired Children
by Training School Personnel, Parents, and Students**

by

Joseph A. Guillory

Cluster 31

**A Practicum II Report Presented to the
Ed.D. Program in Early and Middle Childhood
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education**

NOVA UNIVERSITY

1991

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PRACTICUM APPROVAL SHEET

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March 25, 1991

Date

This practicum report was submitted by Joseph A. Guillory under the direction of the adviser listed below. It was submitted to the Ed.D. Program in Early and Middle Childhood and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova University.

Approved:

April 4, 1991
Date of Final Approval of
Report

Mary Ellen Sapp
Mary Ellen Sapp, Ph.D., Adviser

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ABSTRACT

Improving the Monitoring and Maintenance of Hearing Aids for Preschool and School Age Deaf and Hearing Impaired Children by Training School Personnel, Parents and Students. Guillcry, Joseph A., 1991: Practicum Report, Nova University, Ed.D. Program in Early and Middle Childhood. Descriptors: Audiology/Hearing Impairment/Hearing Aids/Aural Rehabilitation/Hearing Conservation/Deaf/Auditory Training/Child Equipment Failure.

This practicum was designed to improve the monitoring and maintenance of hearing aids and auditory trainers for preschool and school age deaf and hearing impaired children through inservice training. The goal of this practicum was to identify and reduce the number of preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers and may not be maximizing their potential in their educational placement because their hearing aids or auditory trainers are malfunctioning or nonfunctioning.

The writer conducted inservice training programs designed to improve the skills of speech pathologists, teachers, parents and students on the procedures for monitoring and maintenance of hearing aids and auditory trainers. The writer provided training on the types and degrees of hearing loss and how it affects a child's ability to communicate, operation of hearing aids and auditory trainers; procedures and techniques used in the application of materials and equipment utilized in monitoring and maintenance of hearing aids and auditory trainers and identification of malfunctioning and nonfunctioning hearing aids or auditory trainers.

An analysis of the goal and all objectives revealed mastery by all participants in the inservice training program. The identification and reduction in the number of preschool and school age deaf and hearing impaired students who had malfunctioning or nonfunctioning hearing aids or auditory trainers and who were not maximizing their potential in their educational placement was achieved.

Permission Statement

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CHAPTER I

INTRODUCTION

Description of Work Setting and Community

This practicum was conducted in a public school system located in a rural area of a southern state. Because of the school system's location and geographical area, the timely provision of services are sometimes delayed.

The school system has a population of 17,000 students and is geographically large, covering an area spanning 930 square miles. The school system evolved from a one building system to its present 47 educational sites. These sites consist of 24 elementary schools located in 17 communities. The school system also has 11 high schools, three junior high schools, one middle school, five special education schools, two vocational education centers and one alternative education facility. In addition, the school system conducts an adult education program with an annual enrollment of around 500 participants, working toward their General Education Diploma.

The overall population of the communities served by the school system is approximately 82,000. Each community has its own socioeconomic makeup ranging from low-to-middle income. The low income group members are employed as laborers who depend on state and local public assistance for survival. The middle income groups in the various communities consist of people employed in various businesses, the school system and other professions. The majority of the children in the school system are from the lower socioeconomic level. They come

from families with limited educational backgrounds, high rate of unemployment, receive public assistance and are black.

The governance of the school system is by a 13 member board, representing the different communities. It provides for the operation and policy for the system and appoints a superintendent who is directly responsible to it regarding board policies and general operation of the system. The superintendent is assisted by two assistant superintendents and 24 central office supervisors and coordinators. The school system employs 2,000 of whom 1,073 are teachers with the remaining employees falling in various support jobs. The school system is the single largest employer in the area and one of the state's largest school systems.

The annual operating budget for the school system is approximately 45 million dollars. Revenues are secured from federal, state and local sources. Approximately 1.1 million dollars of this budget is dedicated to the operation of the special education department for the provision of services to handicapped students.

The local school system provides a number of direct and support services which contributes to the overall development of children.

Writer's Work Setting and Role

The writer is one of three administrators in the special education department, and he is responsible for the administration and supervision of all aspects of the program. The program has a student population of 2,048 students and a teaching and professional staff of 270. The writer supervises and coordinates the pupil appraisal assessment program, supervises the instructional programs,

and is responsible for child search activities to locate unserved or underserved handicapped children. The writer does direct supervision of psychologists, social workers, educational assessment teachers, speech pathologists, and classroom teachers. The major responsibility of the writer is the administration and supervision of the speech, language, and hearing therapy program having an enrollment of 1,100 students and a professional staff of 34 speech pathologists and one audiologist. The writer is responsible for conducting the hearing testing program which involves the hearing screening of all Head Start students, all students in kindergarten, first, second, third, fifth, seventh, ninth, and twelfth grades. The writer is also responsible for the delivery of appropriate follow-up services for those students found to have hearing problems. These follow-up services include special class placements for deaf and hearing impaired students.

The writer's background and training include a master of science degree in psychology and rehabilitation counseling and a master of science degree in audiology. The writer holds state teacher certification in administration and supervision, speech pathology and audiology, behavior disordered, emotionally disturbed, deaf, hard-of-hearing, learning disabled, mentally handicapped and counseling. The writer also holds the Certificate of Clinical Competence in Speech Pathology and Audiology from the American Speech-Language and Hearing Association (ASHA) and has state licensure in both areas. The writer has 22 years' experience in the public school system and is an adjunct professor in speech pathology and audiology at one of the area's largest universities. The writer has also been in private practice in audiology for thirteen years.

CHAPTER II

Study of the Problem

Problem Description

A child's ability to hear and understand is extremely important in academic achievement and performance. Many preschool and school age deaf and hearing impaired students who are placed in specially designed educational programs and who are wearing hearing aids or auditory trainers may not be maximizing their potential in this educational placement because their hearing aids or auditory trainers are nonfunctional or malfunctioning. These deaf and hearing impaired students who have been provided hearing aids or auditory trainers may encounter significant difficulty in their ability to hear and understand in the educational placement due to nonfunctioning or malfunctioning hearing aids or auditory trainers. Oftentimes these nonfunctioning or malfunctioning hearing aids are not noticed by the parents, teachers of the deaf and hearing impaired, speech pathologists and the children themselves for significant periods of time. This can contribute to delays in academic achievement and performance and the child not totally benefiting from his specially designed educational placement. The difficulty being encountered was that preschool and school age deaf and hearing impaired students who are wearing aids or auditory trainers in their specially designed educational placement and who have nonfunctioning or malfunctioning hearing aids or auditory trainers were not identified as having these nonfunctioning or malfunctioning hearing aids. This results in their not being able to hear at their maximum and are not able to maximize their potential in their educational

placement. During the period where a preschool or school age deaf and hearing impaired student has a nonfunctioning or malfunctioning hearing aid or auditory trainer he is unable to utilize his residual hearing to its optimum and may experience delays in academic performance and achievement. Another difficulty resulting from these nonfunctioning or malfunctioning hearing aids or auditory trainers was the risk of language delays which can be magnified during the time the hearing aids or auditory trainers are not performing properly. This risk is greatly enhanced during the periods of critical language development and learning for preschool and early elementary deaf and hearing impaired students. Several of these deaf and hearing impaired preschool and school age children who are wearing nonfunctioning or malfunctioning hearing aids are not being identified in order that their hearing aids or auditory trainers can be made to function properly. These nonfunctioning or malfunctioning hearing aids or auditory trainers are not being identified by the parents, teachers of the deaf and hearing impaired, students and speech pathologists. These nonfunctioning and malfunctioning hearing aids should be identified by the parents, teachers of the deaf and hearing impaired, speech pathologists, or the students. These nonfunctioning or malfunctioning hearing aids or auditory trainers are not being identified at the school building level by the students, teachers, or speech pathologists. They are also not being identified at home by the parents. The identification of these nonfunctioning and malfunctioning hearing aids or auditory trainers would result in a shorter period the child is wearing a nonfunctional or malfunctioning hearing aid or auditory trainer with immediate repair or replacement of the hearing aid or auditory trainer.

The problem was that some preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers may not be maximizing their potential in their educational placement because their hearing aids or auditory trainers are nonfunctional or malfunctioning. If the problem was solved, preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers would maximize their potential in their educational placement and would not experience nonfunctioning or malfunctioning hearing aids or auditory trainers.

Problem Documentation

The existence of this problem was documented by a needs assessment completed by teachers of the deaf and hearing impaired, parents, and speech pathologists during the 1989-90 school year. The needs assessment revealed that parents, teachers of the deaf and hearing impaired and speech pathologists have no training and did not possess the technical skills for monitoring and maintenance of hearing aids or auditory trainers to determine if they are functional, malfunctioning, or nonfunctional. The results also revealed that they cannot monitor or perform maintenance on hearing aids or auditory trainers and are not sure as to when a hearing aid is functioning or not. The results also indicated that parents feel that they and their children have not received training in monitoring and maintenance of hearing aids. The teachers of the deaf and hearing impaired and speech pathologists indicated that they did not possess adequate training for monitoring and maintenance of hearing aids or auditory trainers. The parents, teachers of the deaf and hearing impaired and speech pathologists,

reported a strong need for training to be able to maintain and monitor hearing aids and auditory trainers. The parents reported a need for their deaf and hearing impaired children to be taught how to monitor and do maintenance checks on their hearing aids or auditory trainers.

The existence of this problem was also documented by the writer's observations of 171 deaf and hearing impaired students indicating that they were unable to monitor and maintain their hearing aids or auditory trainers. These observations also showed that the students lacked the knowledge and skills necessary to monitor and maintain their hearing aids or auditory trainers. These observations also revealed that several of the deaf and hearing impaired students were using malfunctioning or totally nonfunctional hearing aids or auditory trainers. The problems that were found ranged from hearing aids or auditory trainers not turned on, dead batteries, broken cords, broken hearing aids, inappropriate earmolds, cracked or twisted tubing, missing components, plugged up microphones, poorly fitting earmolds, auditory trainers not properly switched to FM channel, batteries placed backwards in hearing aids and totally nonfunctioning hearing aids.

Consultations and interviews with the teachers of the deaf and hearing impaired and speech pathologists substantiated the fact that the children could not monitor and maintain their hearing aids or auditory trainers. They also reported that they needed training in monitoring and maintaining hearing aids or auditory trainers. They recognized a need for training and the incorporation of daily monitoring and maintenance checks of hearing aids and auditory trainers. They felt that this should be incorporated into the daily program for deaf and hearing impaired students. They felt that the training and

incorporation of the monitoring and maintenance would assure that these children had functional hearing aids or auditory trainers in the classroom and at home.

A review of a needs assessment, observations of deaf and hearing impaired students and consultations and interviews with teachers and speech pathologists uncovered that parents, students, teachers and speech pathologists are unable to monitor and maintain hearing aids or auditory trainers and that the teachers, students, parents and speech pathologists have received no technical training, are not aware when the hearing aids or auditory trainers are not functioning and cannot monitor and maintain hearing aids or auditory trainers.

Causative Analysis

One factor related to the cause of the problem was that teachers of the deaf and hearing impaired, parents, students and speech pathologists lack the knowledge and skills necessary for monitoring and maintenance of hearing aids and auditory trainers. This knowledge is an essential prerequisite in determining whether hearing aids or auditory trainers are functional, malfunctioning, or nonfunctioning.

Another factor related to the cause of the problem was that parents, teachers of the deaf and hearing impaired, students and speech pathologists lack the skills necessary to utilize certain materials, supplies, and equipment to help determine if hearing aids or auditory trainers are functioning properly or not. It is extremely necessary to know how to operate certain materials, supplies, and equipment to determine the functionality of hearing aids or auditory trainers. These skills allow for the adequate monitoring and maintenance checks

of hearing aids and auditory trainers to determine their proper operation.

An additional factor related to the cause of the problem was the lack of policies and procedures mandating and outlining monitoring and maintenance of hearing aids or auditory trainers. In addition, there was a lack of materials, equipment and supplies necessary for monitoring and maintenance of hearing aids or auditory trainers. It is essential that written policies and procedures be in place as well as having adequate materials, supplies and equipment for the monitoring and maintenance of hearing aids or auditory trainers.

The most outstanding cause of the problem was that parents, teachers of the deaf and hearing impaired, students and speech pathologists are not properly trained in procedures and techniques for performing monitoring and maintenance of hearing aids or auditory trainers. Specifically, they are unable to determine if a hearing aid or auditory trainer is functioning, malfunctioning, or nonfunctioning. Although the speech pathologists and teachers of the deaf and hearing impaired have had some academic and clinical training in working with hearing aids and auditory trainers their inexperience hinders their performing adequate monitoring and maintenance checks of hearing aids or auditory trainers. This inexperience also hinders their recognizing whether hearing aids or auditory trainers are functioning or not. The parents and students have received very little if any training to recognize and be aware that hearing aids or auditory trainers are functioning properly or not. This limited training hinders their recognition of whether a hearing aid or auditory trainer is functioning and amplifying appropriately.

Relationship of the Problem to the Literature

The importance of identifying nonfunctional or malfunctioning hearing aids or auditory trainers in the classroom and at home has been reported numerous times in the literature by educational and allied health professionals. The earlier a deaf or hearing impaired child's hearing aid or auditory trainer is identified as nonfunctional or malfunctioning, the sooner it can be corrected for maximum use in the educational placement and to assure maximization of this placement in terms of academic achievement and performance.

The writer's review of the literature reveals numerous reports and studies indicating the close association of significant delays in academic performance and achievement resulting from nonfunctioning or malfunctioning hearing aids or auditory trainers. Delays in language development were also found for preschool deaf and hearing impaired students with malfunctioning or nonfunctioning hearing aids. These studies also indicate that the longer a deaf and hearing impaired child utilizes a nonfunctioning or malfunctioning hearing aid or auditory trainer the more serious the delays in academic achievement and performance may become. In addition, the child will not reap the maximum benefits from his specially designed educational placement and program.

Blair, Wright, & Pollard (1981) reported on a questionnaire given to parents of children wearing hearing aids and to teachers of the deaf and hearing impaired regarding their knowledge of hearing aids and whether or not the parents and teachers were well informed enough to determine if a hearing aid is functional or not. They found that most parents and teachers know very little about hearing aids and cannot

support their children in wearing their hearing aids and determining its functionality. This study revealed that parents do not possess the technical skills necessary to be aware of their child's hearing aid in terms of its functionality or not. In addition, they indicated that approximately 61% of the parents studied had little or no information about their child's hearing aid and were unable to maintain or monitor its operation.

Stone and Adam (1985) revealed that language acquisition and educational achievement and performance can be hampered if deaf and hearing impaired students do not have functional amplification systems. They report that many hearing impaired and deaf children are wearing inadequate or malfunctioning hearing aids or other type amplifying systems such as auditory trainers. Information from their article revealed the need for functional amplification in terms of hearing aids or auditory trainers.

Paterson (1986) reported that many professionals who deal with deaf and hearing impaired students on a daily basis, are ill-equipped to deal with hearing aids and other amplifying systems. She goes on to report that many training programs are not providing the knowledge and skills to deal with modern amplification such as hearing aids or auditory trainers. The report also reveals that professionals feel a lack of knowledge regarding the technical operations of a hearing aid and the ability to monitor the child's listening status from day-to-day to determine the hearing aids functionality.

Robinson and Sterling (1980) recorded that parents have very little orientation to their children's hearing aids and had little knowledge regarding the operations and maintenance of the hearing aids.

They studied 98 children who wore hearing aids and their parents. Results revealed that of the 98 hearing aids, 40% (39) were found to be malfunctioning and of the 98 parents 38 knew very little about the child's hearing aid in terms of function or maintenance. The overall results of this study revealed that parents knew little about hearing aids and about their function and maintenance. It also suggests that poor school performance may be associated with improperly functioning or nonfunctioning hearing aids. The study suggests that hearing impaired children with malfunctioning hearing aids suffer a high rate of failure.

Flexer and Wood (1984) described the need for hearing aids to be functional in order that deaf and hearing impaired children receive sufficient amplification to access and maximize their residual hearing. It is useless for a child to wear a hearing aid that is nonfunctioning or malfunctioning; it does not afford the child the opportunity to use his hearing in a meaningful and productive manner.

Lass, Tecca, & Woodfork (1987) studied the knowledge of teachers regarding hearing aids in terms of their academic preparation, experience with, and attitudes toward hearing aids. Results of this study revealed that teachers have significant deficiencies regarding knowledge of hearing aids, experiences with hearing aids, and academic preparation necessary for monitoring and maintaining hearing aids worn by deaf and hearing impaired students. The lack of awareness and understanding of hearing aids can contribute to ineffective educational services for the deaf and hearing impaired students. Implications of this study are that teachers of the deaf and hearing impaired must be knowledgeable of whether a child's hearing aid is functional or not.

In a five year study of children's hearing aids in a large metropolitan school district in Nashville, Kemker, McConnell, Logan, & Green (1979) revealed that malfunctions in the hearing aids were found from 40 to 70% of the time during the five year period and teachers and other professionals appeared unable to determine that the hearing aids were malfunctioning. They reported that malfunctioning hearing aids minimize the child's learning potential through the auditory modality. During the five year period 215 deaf and hearing impaired students were studied.

Martin, Bernstein, Daly, & Cody (1988) addressed the concern of the knowledge of hearing disorders and hearing aids to 187 in-service teachers enrolled in a communication disorders course. Results from an 84-item questionnaire revealed that teachers felt the subject of hearing aids to be extremely important and that teachers are not given enough information about them in their training programs and lacked the skills necessary to adequately deal with them.

Logan and Bess (1985) reported that poor academic performance and academic achievement may occur if school age deaf and hearing impaired students utilize improperly fitted or poorly functioning hearing aids. They stress the fact that deaf and hearing impaired students depend on functional hearing aids in educational settings and oftentimes these hearing aids do not function adequately. Similar problems are also discussed regarding classroom auditory trainers. The importance of properly functioning amplification systems for deaf and hearing impaired students for academic achievement is stressed. They emphasize that functional amplification is the single most effective rehabilitation tool for deaf and hearing impaired students.

Busenbark and Jenison (1986) examined 10 hearing aids at a school for the hearing impaired and found that five hearing aids were malfunctioning. Twenty-one staff members of the school were involved in the examination and determination of the functionality of the hearing aids. The staff members were asked to determine if the hearing aids were functioning by performing routine listening checks. Results revealed that teachers and speech pathologists as well as other professionals who provide educational services for deaf and hearing impaired students have inadequate skills to evaluate aspects of hearing aid performance.

Diefendorf and Arthur (1987) addressed the effectiveness of parents in determining the functioning of hearing aids. They revealed that parents have great difficulty in assessing whether their child's hearing aid is functioning or not. They also reported that a deaf and hearing impaired child's academic success depends to some degree on a functional hearing aid.

Ross and Giolas (1978) reported that it is better not to give a child a hearing aid or auditory trainer if he is given one that doesn't work or is wearing one that is malfunctioning. A deaf and hearing impaired child cannot be expected to achieve at his maximum if his hearing aid or auditory trainer is malfunctioning or not working at all. They go on to report that many studies have shown that approximately one-third to one-half of children's hearing aids could be regarded as functioning adequately on any given day. In addition, they report that parents, teachers of deaf and hearing impaired, and speech pathologists lack the technical skills and knowledge for detecting malfunctioning or nonfunctioning hearing aids or auditory trainers. They conclude that

the determination of whether a child's hearing aid or auditory trainer is working or not is essential to maximum achievement in the child's educational placement.

A number of other writers and researchers have reported that malfunctioning or nonfunctioning hearing aids may have a detrimental effect on academic achievement and performance. Reichmann and Healey (1989) revealed that deaf and hearing impaired students are not receiving an appropriate education and will experience delays in academic achievement and performance if their amplification devices are poorly functioning or nonfunctioning. They reported on 20,014 hearing impaired students and 310 teachers of the deaf and hearing impaired. Results revealed that the level of maintenance and monitoring of hearing aids is extremely poor and that teachers of the deaf and hearing impaired and speech pathologists are not knowledgeable or skilled in monitoring and maintenance of hearing aids. Proper functioning amplification is essential to an appropriate education for deaf and hearing impaired students. Elfenbein, Bentler, Davis, & Neibuhr (1988) also collected data regarding the use of hearing aids as well as their functionality in the classroom setting. They studied 248 deaf and hearing impaired children and 41 teachers of the deaf and hearing impaired. Information was gathered through the use of questionnaires. Results revealed that teachers as well as other school personnel did not monitor hearing aids or knew how to conduct a monitoring procedure. In addition, the students were also found to be lacking in skills necessary to monitor and maintain their own hearing aids. They concluded that hearing aid malfunctions can interfere with a child's performance in the classroom.

Potts and Greenwood (1983) have also documented the high incidence of malfunctioning hearing aids worn by deaf and hearing impaired students. They reported that this is of critical importance in any educational program designed for deaf and hearing impaired students. If children are to be served adequately in their appropriate educational placement, efficient use of their hearing aids is a prerequisite.

Several studies regarding speech pathologists' and teachers' of the deaf and hearing impaired knowledge regarding hearing aids reveal that they lack the knowledge and skills necessary to determine or identify malfunctioning or nonfunctioning hearing aids or auditory trainers. The studies reveal that speech pathologists and teachers may not be able to identify nonfunctioning aids and do not have skills necessary to do monitoring or maintenance checks. Woodford (1987) reported on written and practical examinations that were administered to 102 speech pathologists regarding hearing aids. Results indicate that the majority of the speech pathologists lacked basic knowledge and skills necessary to provide help with hearing aids worn by deaf and hearing impaired students. The report goes on to reveal that if a child is wearing a functional hearing aid, the possibilities are greater that he will function adequately in the classroom placement.

Wilson-Vlotman and Blair (1986) described the results of a survey of audiologists working full-time in various school systems throughout the country. Results from 240 subjects revealed that hearing aids and classroom amplification equipment need frequent attention from teachers and speech pathologists who are trained and knowledgeable about functional and nonfunctional hearing aids. The report goes on to reveal that few individuals in the school systems are qualified and skilled to

monitor and maintain hearing aids.

Lass et al., (1989) studied the responses from a questionnaire from 88 speech-language pathologists regarding knowledge of, exposure to, and attitudes toward hearing aids. Results of this study revealed that there are some deficiencies in their knowledge and exposure to hearing aids. The results indicate that speech pathologists do not have the skills necessary to monitor or maintain hearing aids. The study also reports on the large number of hearing impaired children who have malfunctioning hearing aids. In addition, the report indicates that hearing impaired children will perform better in school with functional hearing aids.

Sheppard, Davis, Gorga, & Stelmachowitz (1981) reported that monitoring and maintenance of hearing aids are not routinely done in the public schools because of a lack of knowledge and training on the part of teachers and speech pathologists.

The importance of deaf and hearing impaired students having functional hearing aids or auditory trainers in their special class settings is found throughout the literature. It has been demonstrated throughout the literature that deaf and hearing impaired students may experience problems in academic achievement and performance if their hearing aids are malfunctioning or nonfunctioning. It has been generally found and substantiated that a properly fitted and functioning hearing aid is essential for the deaf and hearing impaired students to gain maximum benefit from their specially designed placement as well as learning outside of this placement. The literature has revealed that the longer a deaf or hearing impaired student remains with a malfunctioning or nonfunctioning hearing aid, the greater the delays in

academic achievement and performance may become.

The lack of knowledge and skills by parents, teachers, students and speech pathologists regarding the determination of whether a hearing aid or auditory trainer is functioning or not, has been demonstrated throughout the literature. Parents, teachers, students and speech pathologists do not possess the skills and knowledge and have received little or no training to determine if a hearing aid or auditory trainer is functioning or not. The literature reveals that most times these individuals are not aware that the aids are not functioning.

Malfunctioning or nonfunctioning hearing aids or auditory trainers should be identified quickly and solutions found to correct the problem. If these hearing aids or auditory trainers would be identified as malfunctioning or nonfunctioning, this would greatly enhance a deaf or hearing impaired student's chances at maximizing their performance in their educational placement. The risks of delays in academic achievement and performance would be reduced substantially.

It has been documented that many hearing aids and auditory trainers worn by deaf and hearing impaired students are not functioning properly and parents, teachers, students and speech pathologists lack the skills and knowledge necessary to determine whether the hearing aids or auditory trainers are functioning properly or not.

CHAPTER III

Anticipated Outcomes and Evaluation Instruments

Goals and Expectations

The goal of this practicum was to identify and reduce the number of preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers and may not be maximizing their potential in their educational placement because their hearing aids or auditory trainers are malfunctioning or nonfunctioning. Specific objectives will include the identification of malfunctioning or nonfunctioning hearing aids or auditory trainers and to have them function as well as can be expected. The writer expects to achieve the identification of malfunctioning or nonfunctioning hearing aids or auditory trainers worn by deaf and hearing impaired children and to get them functioning properly as quickly as possible.

At the end of the eight-month implementation period, the writer expected that deaf and hearing impaired children, parents, teachers and speech pathologists will be able to monitor and maintain hearing aids and auditory trainers resulting in an overall improvement in their functioning. This will be measured by the quality and quantity of malfunctioning or nonfunctioning hearing aids that are identified. In addition, the number of deaf and hearing impaired children found to have malfunctioning or nonfunctioning hearing aids or auditory trainers will be tabulated as well as type of problem found.

The writer expected immediate diagnosis of a malfunctioning or nonfunctioning hearing aid or auditory trainer and the immediate repair or replacement of the instrument. The immediate identification of

malfunctioning or nonfunctioning hearing aids or auditory trainers and their repair or replacement is the outcome expected as a result of this practicum. After implementation, students, parents, teachers and speech pathologists will be able to monitor and maintain hearing aids or auditory trainers to determine if they are functional or not.

Behavioral Objectives

The following objectives were projected for this practicum:

Objective 1: During the eight-month implementation, parents, teachers of the deaf and hearing impaired, students and speech pathologists, after having been trained, will demonstrate knowledge and skills on the different parts and operations of hearing aids and auditory trainers with 80% accuracy as measured by a diagrammatic examination constructed by the writer.

Objective 2: During the eight-month implementation, parents, students, teachers of the deaf and hearing impaired and speech pathologists, after having been trained, will possess the necessary knowledge, procedures and skills in the application of monitoring and maintenance of hearing aids and auditory trainers to determine if they are functioning or not with 80% accuracy as measured by a practicum and test instrument constructed by the writer.

Objective 3: During the eight-month implementation, policies and procedures mandating daily monitoring and maintenance of hearing aids and auditory trainers will be developed by the writer and disseminated to teachers, parents and speech pathologists with 100% participation as measured by parent signature of receipt.

Objective 4: During the eight-month implementation, after having secured budgetary permission, the writer will obtain adequate and appropriate materials, supplies and equipment that will be used for monitoring and maintenance of hearing aids or auditory trainers by teachers of the deaf and hearing impaired, students, parents and speech pathologists as measured by observations by the writer.

Objective 5: During the eight-month implementation, after having been trained, parents, students, teachers of the deaf and hearing impaired and speech pathologists will recognize malfunctioning or nonfunctioning hearing aids or auditory trainers with 100% accuracy as measured by writer's observation and checklist.

Objective 6: Following the successful completion of the eight-month implementation, parents, teachers, students and speech pathologists will continue to demonstrate their monitoring and maintenance of hearing aids or auditory trainers as measured by the continued use of documentation of quality, quantity, and type of malfunction.

Measurement of Objectives

Objective 1 was measured by the use of a written diagrammatic examination that was designed and administered by the writer (see Appendix A). This examination consisted of diagrams of all the different type hearing aids and auditory trainers, their components, switches and operations. The examination diagram was not labeled and was identified by the teachers, parents, and speech pathologists. It was required that the different components and switches be identified and answers placed on the appropriate line.

Objective 2 was measured through the writer's observations of the students, parents, teachers and speech pathologists' hands-on inspection of all different types of hearing aids and auditory trainers. They were required to check each hearing aid and auditory trainer and determine whether the aids or trainers are functional, malfunctioning, or nonfunctioning. Application and correct procedure was observed and scored on a hearing aid checklist (see Appendix B).

Objective 3 was measured by the writer developing written policies and procedures for conducting monitoring and maintenance of hearing aids and auditory trainers. These were disseminated to all parents, teachers and speech pathologists (see Appendix G).

Objective 4 was measured by the writer obtaining all the necessary materials, supplies and equipment necessary to perform monitoring and maintenance of hearing aids and auditory trainers (see Appendix D).

Objective 5 was measured by the utilization of a hearing aid or auditory trainer checklist (see Appendix E). This checklist contained all of the necessary steps toward completing a monitoring and maintenance of hearing aids or auditory trainers. It had space for the results of the monitoring and whether the hearing aid or auditory trainer is functional or not.

Objective 6 was measured through the tabulation of the quality, quantity and type of malfunction identified by the students, parents, teachers and speech pathologists. This tabulation was taken from the hearing aid monitoring and maintenance checklist.

CHAPTER IV

Solution Strategy

Discussion and Evaluation of Possible Solutions

The identification of nonfunctioning or malfunctioning hearing aids or auditory trainers worn by preschool and school age deaf and hearing impaired students in special class placements is a recommendation found in the literature. The literature indicates that monitoring and maintenance programs designed to identify nonfunctioning and malfunctioning hearing aids or auditory trainers are an essential part of any deaf education program designed to meet the needs of deaf and hearing impaired students. The literature offers suggestions for possible solutions to the problem of malfunctioning or nonfunctioning hearing aids or auditory trainers which may be interfering with a child's ability to maximize his potential in his educational placement. The literature repeatedly documents the need for training in the monitoring and maintenance of hearing aids for teachers, parents, students and speech pathologists (Logan & Bess, 1985; Leavitt, 1984). This monitoring and maintenance can assist in the identification of nonfunctioning or malfunctioning hearing aids. Hearing aid malfunction is a major problem that professionals and parents must learn to solve.

The need for the incorporation of daily monitoring and maintenance programs for identifying malfunctioning or nonfunctioning hearing aids or auditory trainers is uncovered in the literature (Ross & Giolas, 1978; Reichman & Healey, 1989; Mynders, 1981; Woodford, 1987). It is necessary that parents, teachers, speech pathologists and deaf and hearing impaired children be knowledgeable and trained to determine

if hearing aids or auditory trainers are functioning properly.

Children cannot achieve their auditory potential or reach their maximum potential in their educational placements unless a program of monitoring and maintenance of hearing aids or auditory trainers is in place to assure to a great degree that the hearing aids or auditory trainers are functioning at their optimum. A majority of the problems that cause hearing aids or auditory trainers to malfunction can be corrected with a minimum amount of training and skill.

One important aspect of a successful monitoring and maintenance program of hearing aids and auditory trainers is the training and knowledge given to speech pathologists, parents, teachers and deaf and hearing impaired students. It has been found in the literature that daily monitoring and maintenance programs can reduce the number of malfunctioning and nonfunctioning hearing aids and that parents, teachers, children and speech pathologists be trained to conduct routine daily monitoring and maintenance checks (Lass et al., 1989; Robinson & Sterling, 1980; Stone & Adam, 1985; Lass, Tecca & Woodford, 1987; Kemker, McConnell, Logan & Green, 1979; Busenback & Jenison, 1986). An appropriate education cannot be given to deaf and hearing impaired students if their hearing aids or auditory trainers are poorly functioning or nonfunctioning.

Monitoring and maintenance checks of hearing aids and auditory trainers are an important part of the overall educational program for deaf and hearing impaired students. It is quite evident that the literature offers several solutions to the problem. The literature indicates that hearing aid monitoring and maintenance checks are important aspects of the educational program for deaf and hearing

impaired students. The literature suggests that alleviation of poor academic performance may be obtained from a viable hearing aid monitoring and maintenance program and inservice training is needed for parents, teachers, children and speech pathologists in order that they may possess the knowledge and skills to determine if hearing aids are functioning properly or not (Elfenbein, Bentler, Davis & Neibuhr, 1988; Potts & Greenwood, 1983; Diefendorf & Arthur, 1987; Fitch, 1982; Bendet, 1980; Lass et al., 1985; Bess, Sinclair, & Riggs 1984). Monitoring and maintenance of hearing aids and auditory trainers will enhance the detection of those instruments not functioning properly and will result in quicker repair or replacement of the instruments and insure that the students will maximize their potential in their special class placement.

The writer believes that all of the solutions offered in the literature can be implemented with the designated population and in the writer's worksetting. The solutions can assist the writer in achieving his specific goals and objectives. These solutions can reduce the number of nonfunctioning or malfunctioning hearing aids and auditory trainers and help parents, students, teachers and speech pathologists identify malfunctioning and nonfunctioning hearing aids or auditory trainers.

It is the writer's belief that a daily monitoring and maintenance of hearing aids and auditory trainers be included in the educational services provided to deaf and hearing impaired students. This is needed to identify those hearing aids and auditory trainers that are not functioning properly. The writer also believes that parents, teachers of the deaf and hearing impaired and speech pathologists should be given

appropriate training to develop those skills necessary for the identification of nonfunctioning or malfunctioning hearing aids and auditory trainers. The writer also believes that deaf and hearing impaired students, who are of an age of understanding, be given training to develop those skills whereby the students would know how to keep their aids and auditory trainers in good working condition.

Description and Justification for Solution Selected

The literature has provided a number of suggestions and recommendations to improve the identification of nonfunctioning and malfunctioning hearing aids and auditory trainers being worn by deaf and hearing impaired students (Fitch, 1982; Potts & Greenwood, 1983; Diefendorf & Arthur, 1987). This identification of nonfunctioning and malfunctioning hearing aids and auditory trainers would help students to get their instruments repaired or replaced more quickly and allow them the opportunity to maximize their potential in their educational placement. Individuals who are responsible for providing educational services to deaf and hearing impaired students should be given the necessary inservice training to develop the procedures and skills required for monitoring and maintenance of hearing aids and auditory trainers. The literature describes the need for parents, children, teachers and speech pathologists to be given inservice training in order that they may perform daily monitoring and maintenance checks of hearing aids and auditory trainers (Busenbark & Jenison, 1987; Bendet, 1980). This training will help them to troubleshoot hearing aids and auditory trainers and correct a variety of problems.

The writer feels that the solution to the problem is to establish

an inservice training program to train teachers of the deaf and hearing impaired, parents, students and speech pathologists to perform daily monitoring and maintenance checks of hearing aids and auditory trainers, and to determine if they are nonfunctioning or malfunctioning. In addition, the writer will establish policies and procedures for the daily monitoring and maintenance of hearing aids and auditory trainers. This solution is most appropriate because parents, teachers of the deaf and hearing impaired, students and speech pathologists are concerned about functional hearing aids and auditory trainers and are concerned about adequate amplification for maximum utilization in the classroom. The writer feels that appropriate training in the monitoring and maintenance of hearing aids and auditory trainers will improve the skills of parents, students, teachers and speech pathologists in performing daily monitoring and maintenance checks of hearing aids and auditory trainers, and enhance their identification of nonfunctioning and malfunctioning hearing aids and auditory trainers. This training will also help in the immediate identification of improperly functioning instruments and improve their repair and/or replacement. This training would also reduce the risk of deaf and hearing impaired students not receiving maximum benefit from their educational placement. This solution is the most appropriate solution because it relates directly to the literature in terms of the need for and recommendations regarding the development of daily monitoring and maintenance of hearing aids and auditory trainers and the need to implement inservice training for parents, teachers, students and speech pathologists regarding the determination of nonfunctioning, functioning and malfunctioning hearing aids and auditory trainers. The writer feels that this solution

addresses the problem and causes of the problem. It is also felt that the solution will achieve the stated objectives. Therefore, the writer is prepared to conduct inservice training to parents, teachers, students and speech pathologists regarding daily monitoring and maintenance of hearing aids and auditory trainers.

Report of Action Taken

The solution implementation strategy for this practicum began after receiving approval in June, 1990, to begin the implementation phase of the practicum.

Once this approval was obtained, a number of steps were taken to implement the solution strategy. The following steps were taken in the implementation of the solution strategy:

Step 1. The director of special education was consulted regarding permission to implement this practicum as part of the overall speech and hearing program. Permission was granted during the first week of July, 1990. Once all appropriate permissions were obtained, the writer secured all necessary supplies, equipment, and materials through budgetary support from PL 94-142 and Preschool Flow-Through funds.

The writer then made all necessary preparations to conduct inservice training programs to the speech pathologists, parents of deaf and hearing impaired children, teachers of the deaf and hearing impaired and those children who were five years and older who were deaf and hearing impaired. Those children who were below five also attended the inservice training with their parents.

The writer conducted inservice training for the parents, students, teachers of the deaf and hearing impaired and speech pathologists on

the application and procedures for monitoring and maintenance of hearing aids and auditory trainers. The writer provided 14 different inservice training programs and provided individual inservice training to all of the speech pathologists and teachers of the deaf and hearing impaired. Parents of the deaf and hearing impaired children were also given individual inservice training whenever the parents or the writer felt it was necessary.

Step 2. An initial inservice training session for the speech pathologists and teachers of the deaf and hearing impaired was conducted. The speech pathologists and teachers of the deaf and hearing impaired were given an overview of the practicum problem and given the solution strategy. They were informed of their respective roles in the implementation of the solution strategy. Interpreters were used for the deaf and hearing impaired parents and students.

Step 3. An inservice training program was presented to the speech pathologists and teachers of the deaf and hearing impaired on the behavioral manifestations of the various types and degrees of hearing loss and how it affects a child's ability to hear, communicate, and learn. A carefully designed lecture as well as selected slides and charts were used in this presentation.

Step 4. An inservice training program was given to the parents of deaf and hearing impaired students and the students themselves. This workshop involved the behavioral manifestations of the various types and degrees of hearing loss and how it affects a child's ability to hear, communicate, and learn. A carefully designed lecture as well as selected slides and charts were used in this presentation.

Step 5. An inservice training program was delivered to the speech

pathologists and teachers of deaf and hearing impaired on the general structure, function and operation of the various types of hearing aids and auditory trainers, and their use with deaf and hearing impaired students. It was important that the speech pathologists and teachers became aware of the functions and operations of hearing aids and auditory trainers. This was provided through the use of lectures, video recordings, slides and charts.

Step 6. The speech pathologists, teachers of the deaf and hearing impaired, parents, and students were presented an inservice training program on the general structure, function and operation of the various types of hearing aids and auditory trainers and their use with deaf and hearing impaired students. Although the speech pathologists and teachers had previously been given an inservice training program on this subject, they were required to attend in order to work with the parents of the children they served. This gave them an opportunity to become thoroughly familiar with the structure, function and operation of those children's hearing aids and the auditory trainers used in the classroom. This was provided through the use of lecture, video recordings, charts, and on-hands manipulation of the hearing aids and auditory trainers.

Step 7. An inservice training program was provided to the speech pathologists, teachers of the deaf and hearing impaired, parents and students on the various switches and components of the different types of hearing aids and auditory trainers. This inservice training program also provided introductory information on policies, procedures and techniques of performing monitoring and maintenance of hearing aids and auditory trainers. The speech pathologists, and teachers had the

opportunity to work together with the students and parents they serve. This inservice training program was presented through the use of lectures, video recordings, charts, handouts and hands-on manipulation of hearing aids and auditory trainers.

Step 8. An inservice training program to the speech pathologists and teachers of the deaf and hearing impaired was conducted on the use and application of all materials, supplies and equipment utilized in performing monitoring and maintenance of hearing aids and auditory trainers. The speech pathologists and teachers were provided inservice training on the correct use of battery testers, listening stethoscopes, hearing aid brushes, wax removers, forced-air blowers and their personal listening earmolds. Each speech pathologist and teacher were given these items and given step-by-step directions regarding their use in conducting monitoring and maintenance of hearing aids and auditory trainers. The application of these supplies and equipment was demonstrated by the writer utilizing a variety of hearing aids and auditory trainers. The writer then required the speech pathologists and teachers to pair off and to practice monitoring and maintenance checks of various hearing aids and auditory trainers provided by the writer. Throughout this exercise, the writer carefully monitored each speech pathologist and teacher to determine correct utilization of the supplies and equipment. This inservice training was presented through the use of lecture, slides, and actual application of procedures.

Step 9. An inservice training program was delivered to the parents of deaf and hearing impaired students and the students themselves on the use and application of all materials, supplies, and equipment utilized in conducting monitoring and maintenance of hearing

aids and auditory trainers. The parents were given inservice training on the correct use of battery testers, listening stethoscopes, hearing aid brushes, wax removers, forced-air blowers, and their personal listening earmolds. Each parent was given these items for personal use in conducting monitoring and maintenance of hearing aids and auditory trainers. The application of these specific supplies and equipment was demonstrated by the writer utilizing the hearing aids worn by the hearing impaired students with their parents. The writer then required the parents to practice monitoring and maintenance checks of their child's personal hearing aid and the auditory trainer worn by the child in the classroom. Throughout this exercise, the writer carefully monitored each parent to determine correct utilization of the supplies and equipment. The writer then required each child to perform monitoring and maintenance checks on their hearing aids and auditory trainers. This was carefully monitored by the writer and the parents. This inservice training was presented through the use of lecture, slides, and actual application of procedures.

Step 10. The speech pathologists and teachers of the deaf and hearing impaired were given an inservice training program on troubleshooting and on-site minor repairs of malfunctioning or nonfunctioning hearing aids and auditory trainers. The speech pathologists and teachers were instructed on how to troubleshoot hearing aids and auditory trainers and how to do on-site minor repairs such as unclogging earmolds and receivers, clearing moisture from a tubing, replacing broken cords and damaged tubing. The speech pathologists and teachers were given hands-on experience with selected broken hearing aids and auditory trainers having a series of problems with the earmolds, tubing

and cords. The writer carefully observed each speech pathologist and teacher to determine correct application of repairs. This inservice training was presented through the use of lecture, slides and actual application of procedures.

Step 11. An inservice training program was presented to parents of deaf and hearing impaired students and the students themselves on troubleshooting and in-home minor repairs of malfunctioning or nonfunctioning hearing aids and auditory trainers. The parents and students were instructed on how to troubleshoot hearing aids and auditory trainers and how to do in-home minor repairs which would involve unclogging earmolds, clearing moisture from a tubing, replacing broken cords and damaged tubing. The parents were given hands-on experience with selected broken hearing aids and also hands-on with their child's hearing aid and auditory trainer. The writer carefully observed each parent and child to determine correct application of all procedures. This inservice training was presented through the use of lecture, slides and actual application of procedures.

Step 12. An inservice training program on recognizing malfunctioning and nonfunctioning hearing aids and auditory trainers utilizing criteria found on a monitoring and maintenance checklist was conducted. The speech pathologists, teachers, parents and children were provided inservice training on a complete review of identifying malfunctioning and nonfunctioning hearing aids and using a monitoring and maintenance checklist to document pass/fail of the hearing aids and auditory trainers both at home and at school. The parents, speech pathologists and teachers were required to utilize this checklist on a daily basis. The students were requested to remind their parents at home. This

inservice training was presented through the use of lecture and hands-on application of monitoring and maintenance checklist.

Step 13. The speech pathologists and teachers of the deaf and hearing impaired were required to perform the actual application of monitoring and maintenance of hearing aids and auditory trainers in the schools. This hands-on application was closely supervised by the writer to determine appropriate and correct application of procedures for monitoring and maintenance of the hearing aids and auditory trainers. The writer worked with each individual speech pathologist and teacher of the deaf and hearing impaired in their respective schools. All of the deaf and hearing impaired students wearing hearing aids or auditory trainers in the respective schools were given monitoring and maintenance checks of their hearing aids and auditory trainers. It should be noted that these procedures were not limited to those students who participated in the training. The parents were also contacted during this step to reinforce the monitoring and maintenance checks at home and to also encourage additional parents to attend.

Step 14. The speech pathologists and teachers of the deaf and hearing impaired were administered a comprehensive examination. They were given a hands-on practical examination involving the identification of malfunctioning or nonfunctioning hearing aids and auditory trainers provided by the writer. A pass/fail checklist was used to score responses (see Appendix B). The speech pathologists and teachers had to demonstrate appropriate utilization and operation of all supplies and equipment for monitoring and maintenance of hearing aids and auditory trainers. The second part of the examination required the speech

pathologists and teachers to identify and list the names and parts of unlabeled diagrams of hearing aids and auditory trainers (see Appendix A).

Step 15. The parents of the deaf and hearing impaired students and the students themselves were given a comprehensive examination. The parents were required to demonstrate appropriate utilization and operation of the supplies and equipment for monitoring and maintenance of their children's hearing aids and auditory trainers. A pass/fail checklist was used to score responses (see Appendix B). The second part of the examination required the parents to identify and list the names and parts of unlabeled diagrams of hearing aids and auditory trainers (see Appendix A). The students were required to do maintenance and monitoring checks of their own hearing aids and auditory trainers under the parent's direction. Their examinations were also scored on a pass/fail checklist (see Appendix B).

Step 16. The scoring of all examinations was the final step in the solution strategy. The writer scored each examination with a mastery level for passage being set up at 80% accuracy. After the writer compiled the results of the examination, a final inservice program was conducted with the speech pathologists and teachers of the deaf and hearing impaired. They were given their results and final instructions on continuing to monitor and maintain hearing aids and auditory trainers of the children in their respective schools. They were instructed on the continued implementation of this program and encouraged to seek immediate repair of those hearing aids and auditory trainers found to be malfunctioning or nonfunctioning.

As part of the final step in the solution strategy, the parents

and students were involved in a final inservice training program. They were also given the results of their examinations and encouraged to continue this monitoring and maintenance program in their homes. They were requested to continue using the hearing aid and auditory trainer checklist (see Appendix E).

During the eight month implementation phase of this practicum, no significant deviations from the writer's plans were encountered as well as significant difficulties. The only unexpected events were the absences of the speech pathologists and parents for three of the inservice programs. This was dealt with by conducting inservice training with those individual speech pathologists and parents. The only other unexpected event was the inclusion of additional parents and children in the training as a result of the school system offering deaf and hearing impaired services as part of an agreement with a neighboring school system. This was dealt with by offering the inservice training and the purchasing of additional supplies, materials and equipment. In addition to the above unexpected events, children who were not consistently wearing their hearing aids previously, began to do so through the efforts of the parents, teachers and speech pathologists.

CHAPTER V

Results, Discussion, Recommendations, and Dissemination

Results

The problem that existed in this writer's work setting was that some preschool and school age deaf and hearing impaired students who have been provided hearing aids or auditory trainers were not maximizing their potential in their educational placement because their hearing aids or auditory trainers were nonfunctional or malfunctioning. This problem existed because speech pathologists, teachers of the deaf and hearing impaired, parents and students did not possess the necessary skills to perform monitoring and maintenance checks of hearing aids and auditory trainers. Specifically, they were unable to identify hearing aids or auditory trainers that were malfunctioning or nonfunctional.

The solution to the problem was to establish an inservice training program to train speech pathologists, teachers of the deaf and hearing impaired, and parents and students to perform daily monitoring and maintenance checks of hearing aids and auditory trainers and to determine if the equipment was nonfunctioning or malfunctioning. The writer felt that appropriate training in the monitoring and maintenance of hearing aids and auditory trainers would improve the skills of parents, teachers, and speech pathologists in performing daily monitoring and maintenance checks of hearing aids and trainers, and would enhance their identification of nonfunctioning and malfunctioning hearing aids and auditory trainers. The immediate identification of improperly functioning instruments would reduce the risk of deaf and

hearing impaired students not receiving maximum benefit from their educational placement. The writer also felt that the identification of these improperly functioning instruments would also quickly improve the repair and/or replacement time factor.

The goal of this practicum was to identify and reduce the number of preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers and may not be maximizing their potential in their educational placement because their hearing aids or auditory trainers were malfunctioning or nonfunctioning.

Specific objectives were designed to achieve these goals. Following is a list of each objective followed by the results related to that specific objective:

Objective 1: During the eight-month implementation, parents, teachers of the deaf and hearing impaired, students and speech pathologists, after having been trained, will demonstrate knowledge and skills on the different parts and operations of hearing aids and auditory trainers with 80% accuracy as measured by a diagrammatic examination constructed by the writer.

The parents, teachers of the deaf and hearing impaired, students and speech pathologists demonstrated complete mastery of the different parts and operations of hearing aids and auditory trainers. Results revealed 100% mastery for the 34 speech pathologists and four teachers. Results revealed 100% mastery for the 54 parents and 64 students.

Objective 2: During the eight-month implementation, parents, students, teachers of the deaf and hearing impaired and speech pathologists after having been trained, will possess the necessary knowledge, procedures and skills in the application of monitoring and

maintenance of hearing aids and auditory trainers to determine if they are functioning or not with 80% accuracy as measured by a practicum and test instrument constructed by the writer.

The necessary knowledge, procedures and skills in the application of monitoring and maintenance of hearing aids and auditory trainers were observed and scored on a pass/fail checklist. Results for Objective 2 indicate 100% mastery by all of the speech pathologists, teachers, parents and students.

Objective 3: During the eight-month implementation, policies and procedures mandating daily monitoring and maintenance of hearing aids and auditory trainers will be developed by the writer and disseminated to teachers, parents and speech pathologists with 100% participation as measured by parent signature of receipt.

Results of Objective 3 were accomplished with 100% accuracy. The writer developed policies and procedures mandating daily monitoring and maintenance of hearing aids and auditory trainers and had it approved by the local school board. The writer disseminated these policies and procedures to all speech pathologists, teachers and parents. The policies and procedures are now part of the school system's special education plan and are mandated by school board policy.

Objective 4: During the eight-month implementation, after having secured budgetary permission, the writer will obtain adequate and appropriate materials, supplies and equipment to use for monitoring and maintenance of hearing aids and auditory trainers by the teachers of the deaf and hearing impaired, students, parents and speech pathologists as measured by observations by the writer.

Results of this objective indicated that all necessary and

appropriate pieces of materials, supplies and equipment were purchased and given to the speech pathologists, parents, and teachers for their use. It should be noted that the writer has observed the materials, supplies and equipment in use as he worked at various schools and with the parents. The school system has also placed the budgetary request for supplies, materials and equipment for monitoring and maintenance in its annual special education budget.

Objective 5: During the eight-month implementation, after having been trained, parents, students, teachers of the deaf and hearing impaired and speech pathologists will recognize malfunctioning or nonfunctioning hearing aids or auditory trainers with 100% accuracy as measured by writer's observation and checklist.

Results regarding Objective 5, revealed 100% mastery of the use of the checklist for monitoring and maintenance to determine malfunctioning or nonfunctioning hearing aids or auditory trainers. The writer has consistently observed the use of the checklist by teachers, parents and speech pathologists. The writer has observed that on a daily basis the teachers, parents and speech pathologists are using the monitoring and maintenance checklists. It should be noted that the students are bringing the checklists from their parents and giving them to the speech pathologists or teachers for documentation.

Objective 6: Following the successful completion of the eight-month implementation, parents, teachers, students and speech pathologists will continue to demonstrate their monitoring and maintenance of hearing aids and auditory trainers as measured by the continued use of documentation of quality, quantity and type of malfunction.

A review of the checklists utilized by the speech pathologists, teachers and parents revealed that a total of 124 hearing aids and auditory trainers were checked on a daily basis and that several malfunctions were identified. Such problems as broken tubing, clogged earmolds, dead batteries and broken auditory trainer cords were found. In addition, several broken hearing aids were found and immediate repair or replacement was instituted. It should be noted that these malfunctions and nonfunctions were corrected immediately which resulted in the child not wearing a malfunctioning or nonfunctioning hearing aid or auditory trainer. It should also be noted that at the writing of this report, checklists from teachers, parents and speech pathologists continue to come in daily.

Discussion

A review and interpretation of the data indicates that all six objectives were achieved, indicating that the goal to identify and reduce the number of preschool and school age deaf and hearing impaired students who have been provided with hearing aids or auditory trainers and may not be maximizing their potential in their educational placement because their hearing aids or auditory trainers are malfunctioning or nonfunctioning was achieved and will continue to be achieved throughout the remainder of the school year. The writer achieved the identification of malfunctioning and nonfunctioning hearing aids or auditory trainers worn by deaf and hearing impaired students.

A review of the literature reveals that others have met similar positive results in the identification of malfunctioning or nonfunctioning hearing aids and auditory trainers through a monitoring

and maintenance program. Diendorf and Arthur (1987) implemented a training program for monitoring and maintenance of hearing aids and found similar positive results. Bendet (1980) produced similar results in a training program for monitoring and maintenance of hearing aids and auditory trainers. Results were found to be positive. Potts and Greenwood (1983) also revealed positive results in a daily hearing aid monitoring and maintenance program through inservice training of school personnel. In comparison to works of others this writer achieved similar positive results.

Since the goal and objectives were met, several implications became obviously apparent. Speech pathologists, teachers of the deaf and hearing impaired, parents and students are now more acutely aware that malfunctioning or nonfunctioning hearing aids and auditory trainers may cause a child not to maximize his potential in their educational placement because their hearing aids or auditory trainers are malfunctioning or nonfunctioning. This necessitates the daily monitoring and maintenance checks of hearing aids and auditory trainers to determine if they are malfunctioning or nonfunctioning and to get them repaired as quickly as possible. Deaf and hearing impaired children can now have a daily monitoring and maintenance check of their hearing aids and auditory trainers at home as well as at the schools, because the speech pathologists, teachers, parents and students are properly trained in conducting daily monitoring and maintenance checks of hearing aids and auditory trainers. Specifically, they are able to identify malfunctioning or nonfunctioning hearing aids and auditory trainers and get them repaired as quickly as possible. The most important implication flowing from the success of this practicum is

that children are now wearing their hearing aids and auditory trainers consistently. An additional important implication is the administration's desire to continue the program at the level at which it is functioning and provide similar training to newly employed speech pathologists and teachers of the deaf and hearing impaired. The system would also like to continue providing this training to parents and students whenever deaf and hearing impaired students are identified.

The writer experienced two unanticipated outcomes that were very positive and helped in the success of this practicum. One outcome was the extremely high level of interest shown by the administration, the speech pathologists, teachers of the deaf and hearing impaired, parents and students. All of them went beyond the initial requests made of them to ensure the success of this practicum. Secondly, the deaf and hearing impaired students began to wear their hearing aids and auditory trainers more consistently. This indicates an awareness of the need for daily monitoring and maintenance checks of hearing aids and auditory trainers.

Based on the results obtained from the data relating to each objective, the writer concludes that speech pathologists, teachers of the deaf and hearing impaired, parents and students who participated in the practicum, are knowledgeable in the identification of malfunctioning or nonfunctioning hearing aids and auditory trainers. The writer believes that they possess adequate skills necessary to monitor and maintain hearing aids and auditory trainers on a daily basis to ensure the overall improvement in their functioning. The writer believes that the speech pathologists, teachers, parents and students are now able to identify malfunctioning or nonfunctioning

hearing aids and auditory trainers at the school building level and at home, to ensure their quick repair or replacement, and thereby reduce the risk of the deaf and hearing impaired students not maximizing their potential in their educational placement. The immediate identification of malfunctioning or nonfunctioning hearing aids and auditory trainers to determine if they are functional or not was achieved.

Recommendations

1. It is recommended that this practicum continue on an ongoing basis in this writer's school system, and remain a requirement in the school system's speech and hearing program.

2. It is recommended that those parents who did not participate in the inservice training programs be encouraged to participate in future training programs.

3. It is recommended that the speech pathologists and teachers of the deaf and hearing impaired work with regular classroom teachers regarding signs of malfunctioning or nonfunctioning hearing aids or auditory trainers worn by hearing impaired students in the regular classroom.

4. It is recommended that the parents continue to network regarding monitoring and maintenance of their child's hearing aid and auditory trainer and share ideas regarding solutions to problems which are found.

Dissemination

The writer plans to submit the practicum results to the state department of education for possible inclusion as a workshop at the annual special education super-conference to be held in February, 1992.

The writer will submit copies of the practicum to the Academy of Rehabilitative Audiology for possible inclusion as a short course at its annual meeting to be held in June, 1991.

The writer will share the practicum results with other audiologists and speech pathologists at a state association conference to be held in October, 1991.

The writer will submit the practicum results with the state society of hearing aid specialists for possible inclusion as a workshop at its annual meeting to be held in July, 1991.

The writer will submit the practicum results to the Educational Audiology Association for possible inclusion as a short course at its annual meeting to be held in November, 1991.

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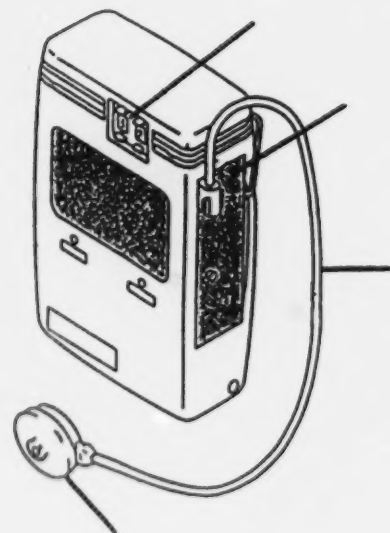
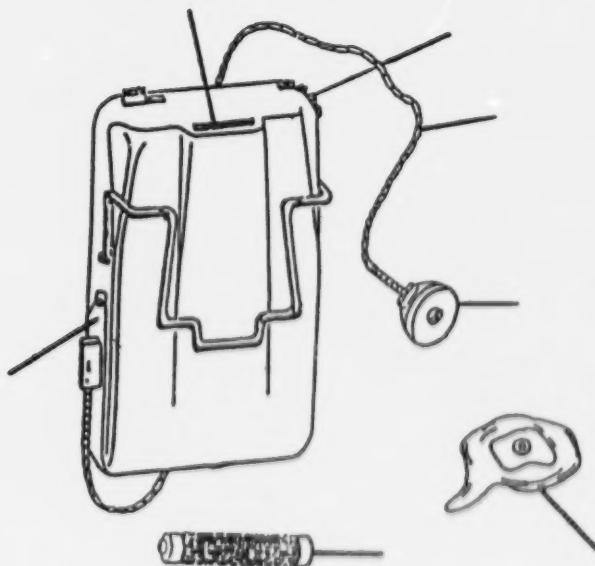
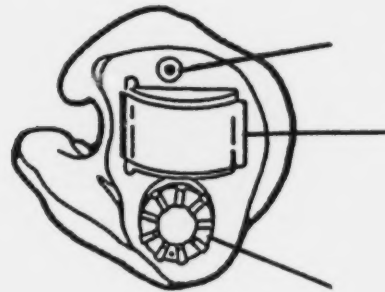
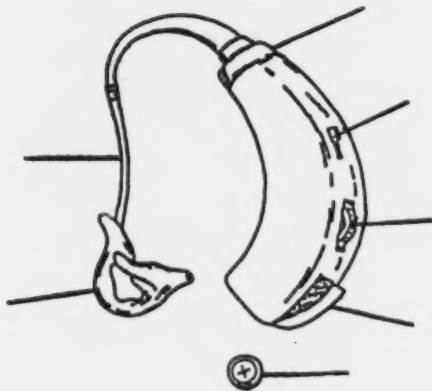
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APPENDIX A
UNLABELED DIAGRAMS OF HEARING AIDS
AND AUDITORY TRAINER

UNLABELED DIAGRAM OF HEARING AIDS

AND AUDITORY TRAINER

50



APPENDIX B
HEARING AID & AUDITORY TRAINER
PASS/FAIL CHECKLIST

**Pass/Fail Checklist for Hearing Aid and
Auditory Trainer Monitoring and Maintenance**

Check one:

Speech Pathologist _____

Teacher _____

Parent _____

NAME: _____

	PASS	FAIL
1. Checked earmold for blockage	_____	_____
2. Checked battery with battery tester	_____	_____
3. Able to place battery in battery compartment	_____	_____
4. Changed setting from telephone to microphone	_____	_____
5. Able to note battery placed upside down	_____	_____
6. Used hearing aid stethoscope to listen to aid	_____	_____
7. Manipulated volume control on hearing aid and auditory trainer	_____	_____
8. Placed pressure on case of aid while listening	_____	_____
9. Manipulated cord of body aid while listening	_____	_____
10. Manipulated volume control for all aids	_____	_____
11. Checked for feedback by turning instrument up and sealing with thumb	_____	_____

Observer

APPENDIX C

POLICIES AND PROCEDURES FOR HEARING AID
AND AUDITORY TRAINER MONITORING AND MAINTENANCE

Policy and Procedure for Hearing Aid
and Auditory Trainer Monitoring and Maintenance

The local school system assures that all deaf and hearing impaired students who are wearing hearing aids or auditory trainers shall have these amplification instruments monitored and maintained on a daily basis. Speech pathologists and teachers of the deaf and hearing impaired shall perform daily listening and visual inspections of the students' hearing aid or auditory trainer. This shall be documented on a daily checklist to be kept in child's folder.

Approved:

Director of Special Education

APPENDIX D

LIST OF SUPPLIES, MATERIALS, and EQUIPMENT

List of Supplies, Equipment and Materials

- 100 - listening stethoscopes
 - 100 - hearing aid brushes
 - 100 - battery testers
 - 100 - carrying cases
 - 100 - personal earmolds
 - 100 - wax removers
 - 1 - display of all types of hearing aids
 - 1 - display of auditory trainers
 - 1 - set of auditory recordings
 - 1 - tape player
 - 100 - pamphlets - How to Get the Most Out of Your Hearing Aid
 - 100 - books - Your Child's Hearing Aid
 - 100 - books - Hearing Aids and You
 - 1 - video player
 - 1 - set of slides
 - 1 - set of spare cords
 - 1 - set of spare batteries
- Video Tapes:
- 1) Educational Amplification for the Hearing Impaired
 - 2) Hearing Aid Monitoring
 - 3) Hearing Aid Basics
 - 4) Personal FM Systems
 - 5) Hearing Impaired Students in the Normal Hearing Classroom
- 100 - Pamphlets - Hearing Aids: A Guide to Their Wear and Care

APPENDIX E

HEARING AID AND AUDITORY TRAINER CHECKLIST

Hearing Aid and Auditory Trainer Checklist

Student's Name: _____

Observer: _____

Hearing Aid / Auditory Trainer (Circle one)

Directions: Please carefully remove hearing aid or auditory trainer from child's ear and note volume setting.

<u>Component</u>	<u>Procedure</u>	<u>Pass</u>	<u>Fail</u>
Battery	Check voltage Is battery in right?	_____	_____
Earmold	Visual inspection Is earmold blocked?	_____	_____
Case	Visual inspection Is case cracked?	_____	_____
Microphone	Visual/Listening Inspection Is microphone blocked?	_____	_____
Volume Control	Visual/Listening Inspection Is there any static when turned?	_____	_____
Cord	Visual/Listening Inspection Is cord broken?	_____	_____
Receiver	Visual/Listening Inspection Is there feedback?	_____	_____
Feedback	Listening Inspection	_____	_____
Tubing	Visual Inspection Is tubing cracked or bent?	_____	_____
On/Off Switch	Visual/Listening Inspection Is there intermittence or static?	_____	_____

Overall Condition of Aid or Auditory Trainer: Circle one

(1) Good (2) Acceptable (3) Poor

Findings:

- _____ 1. Hearing Aid or Auditory Trainer Functional
- _____ 2. Hearing Aid or Auditory Trainer Needs Repair
- _____ 3. Minor maintenance or repair performed by school personnel. Describe.

Observer